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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/345,669	06/30/1999	RONALD K. MINEMIER	INTL-0227-US	1490

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EXAMINER	
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ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/345,669	MINEMIER, RONALD K.	
	Examiner	Art Unit	
	Nhan T. Tran	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-13,15-17 and 19-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-13,15-17 and 19-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/12/2005 have been fully considered but they are not persuasive.

Regarding independent claims 1, 15 and 22, the Applicant asserts, "Because Fossum's 'investigation' of bad pixels merely identifies bad pixel areas according to a type of group (e.g., column, row, neighborhood), his 'investigation' has nothing to do with determining a number of spatial defects based on the number of pairs of adjacent defective pixels that are closer than a given offset."

In response, the Examiner respectfully disagrees. The claim limitations "determining a number of spatial defects based on a number of pairs of adjacent defective pixels that are closer than a given offset by analyzing said data" read on Fossum's disclosure as following:

i) A number of spatial defects is determined as a number of groups of defective pixels in Fossum, col. 3, lines 24-32. It is clear in Fossum that a group of defective pixels comprises a plurality of defective pixels within a predefined area of the image sensor, i.e., entire row, entire column, 3x3 neighborhood and/or 5x5 neighborhood around x and y coordinates (col. 3, lines 1-23). Thus, each group represents a spatial defect, and all spatial defects are counted to determine a number of spatial defects as disclosed in col. 3, lines 24-32.

ii) The number of spatial defects (the number of groups of defective pixels) is determined based on a number of pairs of adjacent defective pixels that are closer than a given offset. As disclosed by Fossum, each group is identified as a defective group if there is more than one defective pixels within a predefined area (i.e., 3x3 or 5x5 pixels around x and y coordinates), otherwise the defective pixel is an individual defect, not a spatial defect which requires at least two defective pixels. See Fossum, col. 1, lines 63-67 and col. 3, lines 1-23. In view of the Fossum's disclosure, each group has at least two defective pixels (a pair of defective pixels) located within a predefined offset, for instance, an offset of 3 pixels around x and y, or 5 pixels around x and y and so on. It is also seen that the at least two defective pixels are considered as adjacent defective pixels since they are neighborhood pixels within an area. Importantly, the claim does not clearly define how adjacent the pixels are, so they are not necessary to be immediately adjacent. As long as one defective pixels is somewhere around the other defective pixel within the predefined area, these pixels are considered as adjacent pixels.

iii) "a number of pairs of adjacent defective pixels" is also met by inherency of each group. For example, the defective group 3x3 has a maximum number of 9 defective pixels, which is inherently comprised by 36 logic pairs of defective pixels, and has a minimum number of 2 defective pixels forming one pair of defective pixels.

In view of the above, the Applicant's claimed invention is met the combined teachings of Therrien and Fossum. Therefore, the rejection is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 8-13, 15-17, 19-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Therrien (US 4,523,231) in view of Fossum et al (US 6,611,288).

Regarding claim 1, Therrien discloses a method of detecting sensing element arrays comprising: reading out a frame of sensing element data from an array (21); and determining a number of defective pixels by analyzing the data during the frame read out. See Abstract, Figs. 1-7B and col. 2, lines 14-50.

Therrien does not explicitly disclose that determining a number of spatial defects based on a number of pairs of adjacent defective pixels that are closer than a given offset. However, as taught by Fossum, a number of spatial defects (a number of defective groups of pixels) is determined based on a number of pairs of adjacent defective pixels that are closer than a given offset (i.e., within an offset of 3 pixels or 5 pixels around x and y coordinates) so as to effectively identify a group of defective pixels beside identifying single defective pixel for further pixel correction. See Fossum, col. 1, lines 53-67 and col. 3, lines 1-32.

Therefore, it would have been obvious to one of ordinary skill in the art to modify the imaging in Therrien to incorporate the teaching of Fossum for determining not only a

plurality of single defective pixels but also determining a group of defective pixels (spatial defects) based on a number of pairs of adjacent defective pixels that are within a predefined offset so as to effectively identify spatial defects as groups of defective pixels. Such an implementation would improve signal processing speed for pixel correction due to reduction in a number of individual defective pixel to be processed by grouping into spatial defects.

Regarding claim 2, Therrien also discloses that the sensing element array is an imaging array and that the method further including programmably setting (by means of hardware) high and low limits for pixel intensity values (Fig. 4; col. 7, lines 44-52 and col. 8, lines 17-25, wherein each reference digital signal has been programmed by means of logic circuits for comparing at the comparators).

Regarding claim 3, it is clear in Therrien that high and low limits are set based on illumination conditions (lamp off and lamp on). See Therrien; Fig. 4; col. 7, lines 44-52 and col. 8, lines 17-25, wherein each comparator is set to a digital reference signal limit corresponding to each illumination condition.

Regarding claims 4 & 5, see the analyses of claims 2 & 3.

Regarding claim 6, it is also clear in Therrien that defective pixels in the focal plane of the pixel array 21 are all identified (col. 2, lines 25-50).

Regarding claim 8, as analyzed in claim 1, Fossum teaches that a programmable offset of 3 pixels or 5 pixels around x and y of a central pixel is set to identify defective pixels that are closer together in the area of 3x3 or 5x5, respectively, (Fossum, col. 3, lines 1-23) to enable a defective pixel area to be identified not only as a single defective pixel but also as a group of pixels that are some way defective (col. 1, lines 65-67).

Regarding claim 9, Therrien does not clearly disclose adding a column or row addresses where a defect exists to a programmable offset and storing the address with the offset. Fossum further teaches that column or row addresses where a defect exists to a programmable offset are added and stored in form of (R, C, T) to define a defective location as spatial defects (see Fossum, col. 3, lines 1-23). It is seen that the row and column addresses are added to the indicia and stored in the register to expand the area of a defective group. Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Therrien and Fossum to arrive at the Applicant's claimed invention for not only storing a location of single defective pixel but also storing locations of group of defective pixels so as defective locations would be recognized quickly during correction process, thereby improving processing speed.

Regarding claim 10, the combined Therrien and Fossum teaches counters and the like for use to compare the neighborhoods for defective pixels (see Fossum, col. 4, lines 16-20).

Regarding claim 11, the combined Therrien and Fossum also teaches that the number of spatial defects by column and row is identified by analyzing the data (see Fossum, col. 3, lines 1-23).

Regarding claim 12, Both Therrien and Fossum disclose that the information about the location of defective pixels is stored in a memory (see Therrien, col. 10, lines 38-54 and col. 11, line 50 – col. 12, line 7, and Fossum, col. 2, lines 63-65).

Regarding claim 13, Therrien further discloses that each of RAM 95 (Fig. 7B) is a 1K-10bit RAM which has enough 1024 different 10-bit word to correspondingly store 1024 elements in each line (col. 10, lines 47-53 and col. 11, lines 13-18) and a defect exist bit is represented by the address of the defective pixel itself in the RAM 95.

Regarding claim 15, see the analyses of claims 1 & 2. Although Therrien does not teach an article comprising a medium that stores instructions that cause a processor based system to perform the steps of claim 1, this lack of teaching is compensated by Fossum. Fossum discloses that it is well known for an imaging apparatus to be configured using a software program stored in a storage medium that causes a processor-base system to perform all equivalent steps as performed by hardware circuitry (see Fossum, col. 4, lines 24-27). Therefore, it would have been obvious to one of ordinary skill in the art to configure the imaging apparatus by combining the

teachings of Therrien and Fossum utilizing a software program to arrive at the Applicant's claimed invention so as to reduce a number of hardware circuitry as well as providing flexible and upgradeable apparatus.

Regarding claims 16 & 17, see the analyses of claims 3 & 4 and note that the analysis of claim 15 is also applied.

Regarding claim 19, see the analysis of claim 8 and note that the analysis of claim 15 is also applied.

Regarding claims 20 & 21, see the analyses of claims 11 & 12 and note that the analysis of claim 15 is also applied.

Regarding claim 22, see the analysis of claim 1 and Figs. 1-7B in Therrien for a sensing device and circuit configuration.

Regarding claim 23, see the analysis of claim 2. In order to for the digital reference signals 16 and 48 (Therrien, Fig. 4) to be set for high and low limits, a storage for storing these signals is inherent in such an imaging system for the system to function as disclosed.

Regarding claim 24, as clearly disclosed by Therrien, a circuit is adapted to determine the number of spatial defects by analyzing the pixel data as it is read out from said elements (Therrien, col. 2, lines 25-50).

Regarding claim 25, see the analysis of claim 9, wherein "a window circuit" is represented by the circuitry of defective error detection shown in Figs. 1, 4,5, 7A & B in Therrien and/or Figs. 2 & 3 in Fossum.

Regarding claim 26, the combined Therrien and Fossum teaches a comparator 320 adapted to compare address of a defective pixel to the stored address plus the programmable offset (col. 3, line 55 – col. 4, line 7).

Regarding claims 27 & 28, see the analyses of claims 12 & 13.

Regarding claims 29 & 30, Fossum teaches that the image sensor and defective pixel detection circuitry is integrated into a single chip (same die) as shown in Figs. 2 & 3. Therefore, it would have been obvious to one of ordinary skill in the art to implement the teaching of Fossum in combination with Therrien to build image sensing device and defective pixel detection circuitry on a single chip, thereby reducing size and cost of the imaging apparatus.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (571) 272-7371. The examiner can normally be reached on Monday - Thursday, 7:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.

DAVID OMETZ
SUPERVISORY PATENT EXAMINER